

Attorney Docket No. 2006_0024A
Kazumasa KAMACHI et al.
Serial No. 10/564,483
January 22, 2008

AMENDMENTS TO THE DRAWINGS

Please replace Figures 3-5 with new replacement Figures 3(a) and (b), 4(a) and (b) and 5(a) and (b) (6 sheets; A4 paper).

REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Drawings

Figures 3, 4 and 5 have been amended to provide clarity to the drawings. Figure 3 is now presented as Figures 3(a) and 3(b), with Figure 3(a) containing the data from Examples 1-5 and Figure 3(b) containing the data from Comparative Examples 1 and 2. The same is true for Figures 4 and 5, now Figures 4(a) and 4(b), and 5(a) and 5(b), respectively. No new matter has been added to the application by these amendments.

Specification Amendments

The specification has been amended on page 11 to made changes of an editorial nature. The specification has also been amended on pages 8, 19 and 20 to refer to amended Figures 3(a) and 3(b), 4(a) and 4(b) and 5(a) and 5(b). No new matter has been added to the application by these amendments.

Claim Amendments

Claim 1 has been amended to include that the process uses an upflow anaerobic sludge blanket treatment apparatus, comprising feeding organic wastewater to said upflow anaerobic sludge blanket treatment apparatus so a flow rate of said organic wastewater inside said apparatus is between 0.5 and 5 m/h. Support for these limitations can be found on page 9, lines 20-23 and page 10, line 6 to page 11, line 22. Claim 1 has also been amended to include the predetermined value of between 1 and 2%, which was previously set forth in claim 2. As a result of this amendment, claim 2 has been cancelled, without prejudice. Claim 1 has also been amended to recite that the desulfurization treatment is a desulfurization treatment by adding a desulfurization agent containing an iron ion. Accordingly, this language has been removed from claim 3.

Claims 4-8 have been cancelled, without prejudice.

No new matter has been added to the application by the above-discussed amendments.

Provisional Obviousness-Type Double Patenting Rejection of Claims

1, 2 and 6 Based on Co-pending Application No. 10/552,818

The Examiner has provisionally rejected claims 1, 2 and 6 as being unpatentable over claims 6, 7, 9 and 12 of co-pending Application No. 10/551,818. Applicants respectfully request that the Examiner hold this rejection in abeyance, pending an indication that the claims are otherwise allowable.

Rejection of Claim 1 Under 35 U.S.C. § 112, Second Paragraph

The rejection of claim 1 as being indefinite under 35 U.S.C. § 112, second paragraph has been rendered moot by the above-discussed claim amendments.

Patentability Arguments

The patentability of the present invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks.

In the present application, the subject to be treated is wastewater in which the concentration of sulfur compound is high. By using an iron-type desulfurization agent, the concentration of hydrogen sulfide in the biogas generated is maintained between 1 and 2%, which allows stable methane formation.

By controlling the flow rate of the organic wastewater inside the upflow anaerobic sludge blanket treatment apparatus to be between 0.5 and 5 m/h, iron sulfide is removed to outside of the apparatus. Thus, stable treatment can be carried out even in wastewater in which the concentration of sulfur compound is high.

Rejections Under 35 U.S.C. § 102

Rejection Based on Kamachi et al. (U.S. Publication No. 2006/0243660)

The rejection of claims 1, 2, 4, 6 and 7 under 35 U.S.C. § 102(e),(f) as being anticipated by Kamachi et al. (U.S. Publication No. 2006/0243660) is respectfully traversed.

The Examiner takes the position that Kamachi et al. teach a process for methane fermentation treatment of an organic wastewater containing a sulfur compound, which comprises detecting a concentration of hydrogen sulfide in a biogas generated from a step of methane fermentation treatment, and conducting a control of subjecting the organic wastewater to a desulfurization treatment operation in the case that the concentration of hydrogen sulfide in the biogas exceeds a predetermine value, adding an iron-containing compound.

The abstract of Kamachi et al. describes a method and apparatus for the anaerobic methane fermentation of a wastewater containing a sulfur compound, where an oxidizing agent such as ozone, hydrogen peroxide, sodium hypochlorite or a bromine based oxidizing agent, is added to an organic wastewater to oxidize the sulfur compound contained therein to molecular sulfur before the anaerobic treatment step. Thus, the teachings of Kamachi et al. discuss the addition of an oxidizing agent, which, when added in excess, causes damage to anaerobic microorganisms. Specifically, as disclosed in paragraph [0034] of the reference, when the additive amount of the oxidizing agent is excessively large, the costs increase, and the growth of anaerobic bacteria used in the later stage is inhibited.

On the contrary, Applicants' presently claimed process subjects the organic wastewater to a desulfurization treatment by adding a desulfurization agent containing an iron ion, such as ferric chloride. There is no problem using an iron-type desulfurization agent, since it forms iron hydroxide flocks which have no effect on the microorganisms.

Accordingly, it is evident that the process disclosed by Kamachi et al. is distinct from the process claimed by Applicants, since the reference uses an oxidation agent and the presently

claimed invention uses an iron-type desulfurization agent. Therefore, the invention of claims 1 and 3 is clearly patentable over Kamachi et al.

Rejection Based on Yoda (JP 8-323387)

The rejection of claims 1, 3, 6 and 7 under 35 U.S.C. § 102(b) as being anticipated by Yoda et al. (JP 8-323387) is respectfully traversed.

The Examiner takes the position that Yoda et al. teach a process for methane fermentation treatment of an organic wastewater containing a sulfur compound, which comprises detecting a concentration of hydrogen sulfide in a biogas generated from a step of methane fermentation treatment, and conducting a control of subjecting the organic wastewater to a desulfurization treatment operation in the case that the concentration of hydrogen sulfide in the biogas exceeds a predetermine value, adding an iron-containing compound in the recited molar ratio.

In the teachings of Yoda et al., the flow rate of organic water inside a reactor is not clearly described. (It is assumed to be 0.1 m/h). On the contrary, Applicants' amended claim 1 requires feeding the organic wastewater to the upflow anaerobic sludge blanket treatment apparatus at a rate of between 0.5 and 5 m/h.

Additionally, the concentration of hydrogen sulfide in a biogas generated is 25-310 ppm in the Examples of Yoda et al. Thus, the concentration of hydrogen sulfide in a biogas generated in Yoda et al. is quite different from that of Applicants' presently claimed invention.

For these reasons, the invention of claims 1 and 3 is clearly patentable over Yoda et al.

Rejection Based on Trocciola et al. (U.S. Patent 5,916,438)

The rejection of claim 1 under 35 U.S.C. § 102(b) as being anticipated by Trocciola et al. has been rendered moot by the incorporation of claim 2 into claim 1.

Rejections Under 35 U.S.C. § 103(a)

Rejection Based on Yoda et al. or Trocciola et al.

The rejection of claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Yoda et al. or Trocciola et al. is respectfully traversed. [Claim 2 has been cancelled, so Applicants discuss claim 1 below.]

The Examiner admits that Yoda et al. and Trocciola et al. fail to disclose the recited concentration. The Examiner takes the position that it would have been obvious to one skilled in the art to set the threshold amount of hydrogen sulfide levels at 1%.

Applicants' arguments regarding Yoda et al., which are set forth above, are equally applicable to this rejection.

Regarding Trocciola et al., the flow rate of organic wastewater inside the reactor is not described. As mentioned above, Applicants' amended claim 1 requires a flow rate of between 0.5 and 5 m/h. Additionally, the concentration of hydrogen sulfide in a biogas generated is not described, as admitted by the Examiner. The concentration of hydrogen sulfide in a gas to be treated is 5 ppm. Thus, the concentration of hydrogen sulfide in a biogas generated is assumed to be several thousands of ppm. Therefore, contrary to the Examiner's general assertion, the concentration of hydrogen sulfide in a biogas generated in Trocciola et al. is quite different from that of Applicants' presently claimed invention.

Therefore, the invention of claim [1] is clearly patentable over the teachings of the cited references.

Rejection Based on Yoda et al. or Trocciola et al. in view of Kato et al.

The rejection of claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Yoda et al. or Trocciola et al., in view of Kato et al. has been rendered moot by the cancellation of claim 4.

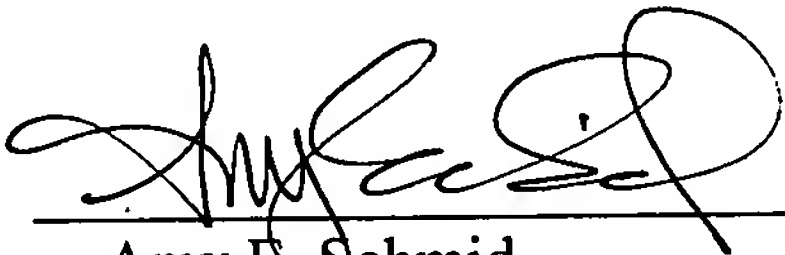
Conclusion

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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